U.S. Cement Industry's Voluntary Climate Change Program

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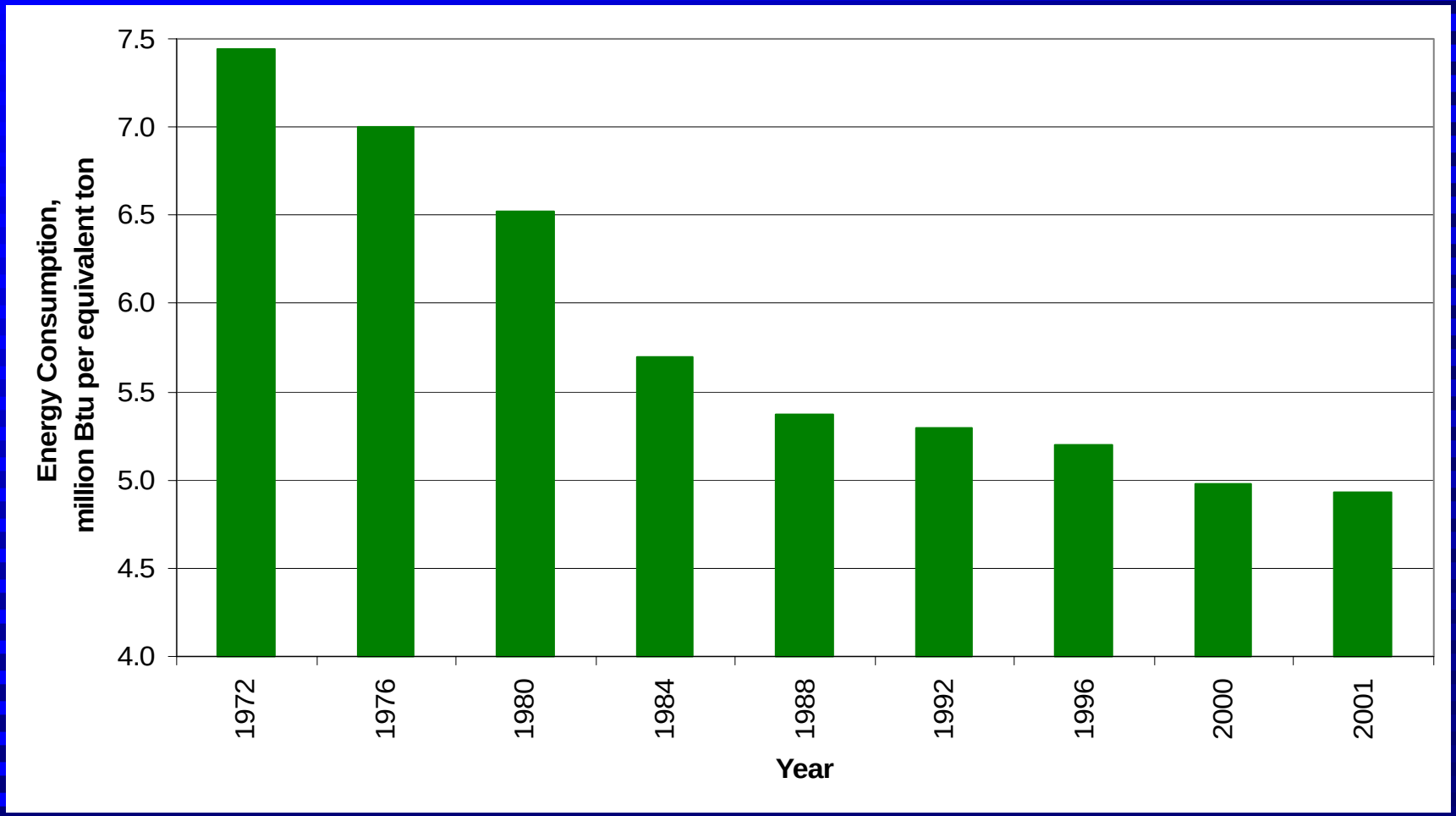
Presentation Overview

- Cement Manufacturing; Energy Efficiency Trends
- Cement Industry CO_2 Emissions
  - California Emissions
- Cement Industry Voluntary Goal
- Approach Used to Develop Climate Change Program/Goal
- Climate Change Program:
  - Process
  - Product Formulation
  - Product Application

Cement Manufacturing Process

Energy Used to Make Cement



Cement Industry CO_2 Emissions

1.5%-2.0% of U.S. CO_2 emissions, from:

Combustion: Burning of fossil fuels to produce process heat

~45 million metric tons annually

Calcination: Conversion of limestone ($CaCO_3$) to CaO which liberates CO_2

~45 million metric tons annually

California Cement Industry CO_2 Emissions

Current clinker capacity in California is approximately 12.2 million metric tons for gray and white cement

Combustion Emissions:

~ 6.1 million metric tons annually

Calcination Emissions:

~ 6.1 million metric tons annually

Cement Industry Goal

Goal: The U.S. cement industry has adopted a voluntary goal of reducing CO_2 emissions by 10% (from a 1990 baseline) per ton of cementitious product produced or sold by 2020.

PCA is Participating in the Bush Administration's Climate VISION Program.

Program/Goal Development

- Quantify CO_2 emissions and identify potential emission reduction approaches—1997
- Brief cement industry CEOs—1997
- Participate in DOE sector analyses—1997
- Begin participation in Climate Wise Program—1998
- Develop industry-specific emission protocol—1998

Program/Goal Development

- Assess long-term trends, identify specific emission reduction strategies—1999, 2000
- Receive EPA Climate Protection Award—2000
- Adopt voluntary climate change goal—2001
- Co-develop WBCSD/WRI emission protocol—2001, 2002
- Announce goal in conjunction with Climate VISION program—2003

Climate Change Program

Three Components*:

- Process
- Product Formulation
- Product Application

*Progress towards goal measured using results of first two components.

Process

Objective: Increase Efficiency/Decrease Fuel Use and Carbon Content

- Participate in Energy Star Program
  - Over 2 million metric tons of CO_2 avoided through program efforts by 2000
  - Develop Energy Performance Indicator
- Use alternative fuels and raw materials
  - Steel Slag as limestone substitute
  - Tires and other materials as fuels reduce carbon content and avoid NOx, SOx, CO and other emissions

Process

- Measure progress
  - Conduct annual survey of emissions
  - Utilize WBCSD/WRI protocol
  - Record emissions Under 1605(b) program
  - Produce annual report

Product Formulation

Objective: Produce Cement Using Lower Proportion of Calcined Materials

- Intergrind limestone with cement
- Harmonize cement specifications
- Produce blended cements

Product Application

Objective: Promote Concrete as Solution to Climate Change

- Car and truck mpg improvements:
  - Replace asphalt pavements with concrete to make pavement more rigid
- Commercial and residential electricity consumption reductions:
  - Concrete structures require less energy due to thermal mass
- Urban heat island mitigation:
  - Replace dark colored surfaces with light ones